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Revision of the Genus *Guardiola*

By B. L. ROBINSON

The small and natural genus *Guardiola* extends from the mountains of southern Arizona to southern central Mexico. Its Mexican distribution is a peculiar one. Well represented in the northwestern states of Sonora, Chihuahua, and Tepic, it passes southeastward to the state of Vera Cruz on the Gulf, but is as yet unknown in northeastern Mexico and, what is more surprising, appears to form no part of the rich and varied vegetation of the southwestern states of Oaxaca and Guerrero. The genus is well marked among the melampodioid Compositae by its peculiar habit, cylindrical heads, broad thin scarcely herbaceous much imbricated involucre scales, and characteristic columnar achenes. Mexican material of the genus has of late been accumulating rapidly at the Gray Herbarium and the impossibility of bringing the diverse forms satisfactorily under the four or five hitherto recognized species has led to the preparation of the present synopsis.

The material of *G. Tulocarpus* now at hand shows that Dr. Gray's varieties *arguta* and *angustifolia* are too remote to make intergradation likely, and they are accordingly here treated as independent species.

Synopsis of the Species

* Involucre scales dorsally convex but not carinate : leaves broadly ovate to rotund, cordate at the base.

+ Heads large (for the genus) and few, in terminal umbelliform cymes, these exceeded in length by the subtending foliaceous bracts : leaves suborbicular, closely sessile.

1. *G. ROTUNDIFOLIA* Robinson, Proc. Am. Acad. **29** : 317.

Hills near Tequila, Jalisco, *Pringle*, no. 4571. Type in herb. Gray.

+ + Heads of medium size, often numerous, the cymes exceeding the rather small subtending bracts : leaves ovate, sessile or subsessile, shallowly cordate.

2. *G. PLATYPHYLLA* Gray, Pl. Wright. **2** : 91.

Arizona, by streams, Sta. Catalina Mountains, *Pringle* ; Wash of El Rialta, *Lemmon* ; Sonora, *Wright*, no. 1236 (type, in herb. Gray) ; *Thurber*, no. 999 ; *Schott* ; *Palmer*, no. 280 (coll. of 1890) ;

Hartman, nos. 124, 270; *F. E. Lloyd*, no. 420; S.W. Chihuahua. *Palmer*, no. 35 (coll. of 1885).

+ + + Heads few and large, in umbelliform clusters at the ends of the branches, the subtending bracts almost as large as the foliar leaves : leaves petiolate, subreniform-ovate, deeply cordate.

3. *G. Rosei* sp. nov.

Slender glabrous and glaucous perennial, 3-4 dm. high : stems terete, striate ; branches opposite : petioles 6-8 mm. long ; leaves subreniform-ovate, coarsely cuspidate-dentate, 3-nerved from the base, 4-5.5 cm. long, 3-4.8 cm. broad, bright green above, glaucous beneath, acutish and cuspidate at the tip, cordate with a rather deep open sinus at the base ; the floral leaves scarcely smaller ; 3-headed terminal cymes surpassed by their subtending bracts ; pedicels glabrous, glaucous, 1-2 cm. long ; involucre scales oblong, obtuse, 1.3 cm. long, 5 mm. broad : ray-flowers about 3 ; ligules oblong, white, 4 mm. long, the slender tubes 6 mm. in length : achenes moderately compressed, upwardly villous under a lens, at maturity 6 mm. long, fuscous, minutely mottled ; disk flowers 4-5-parted.

Collected between Sta. Gertrudis and Sta. Teresa, Tepic, Mexico, by Dr. J. N. Rose, 8 August, 1897, no. 2078, and 96 km. south of Guadalupe y Calvo, S. W. Chihuahua, altitude 2300-2600 m., by E. W. Nelson, August, 1898, no. 4806. Types in herb. Gray and herb. U. S. Nat. Museum.

* * Outer involucre scales carinate.

4. *G. carinata* sp. nov.

Branched slightly lignescent perennial, finely ciliated upon the young petioles, otherwise glabrous : stem slender, terete, glaucous : petioles about 1.3 cm. long, glabrate : leaves lance-oblong, subhastately angled or toothed on either side the subcordate base, finely serrate with incurved cartilaginous-tipped teeth, scarcely pale beneath, 3-4 cm. long, 1.8-2.2 cm. broad : pedicels 7-9 mm. long, axillary or cymose at the ends of the branches ; involucre in anthesis 1.1 cm. long ; scales ovate, obtuse to acuminate, the 3 outer ones strongly carinate : ray-flowers much later in their development than the disk-flowers, the heads thus proterandrous : ligules minute : achenes pale, subterete, 6 mm. long, upwardly villous under a lens, minutely mottled.

Collected by Dr. J. N. Rose at Acaponeta, Tepic, Mexico, 23 June, 1897, no. 1498. Well marked by its carinate involucre scales, which are not found elsewhere in the genus. Types in herb. Gray and herb. U. S. Nat. Museum.

*** Involucral scales dorsally convex but not carinate; leaves lance-oblong to linear, petioled.

+ Leaves cordate or subcordate at the hastately lobed base, coarsely toothed.

5. *G. odontophylla* sp. nov.

Glabrous, somewhat glaucous: stem terete, purple, striate, branched: petioles 8–10 mm. long; leaves lance-oblong, coarsely and somewhat doubly dentate, 5 cm. long, 2.2 cm. broad at the hastately bilobed base, green on both sides, the teeth rather broad, spreading, scarcely at all incurved, acutish to acuminate; the floral leaves scarcely reduced, bearing elongated basal lobes: heads subumbellate by 2's and 3's at the ends of the branches; pedicels 3–4 mm. long; involucral scales lance-oblong, acute, 1 cm. long; achenes ashy, punctate, upwardly villous under a lens, compressed, 7 mm. long.

Collected by E. W. Nelson between Ramos and Inde, Durango, 11 to 14 August, 1898, no. 4683. Types in herb. Gray and herb. U. S. Nat. Museum.

+ + Leaves cuneate or obtuse at the base.

++ Heads relatively broad; involucre 4 mm. thick; pedicels 3–14 mm. long; leaves (with rare exceptions) hastately toothed at the base; the floral leaves considerably exceeding the cymes.

= Leaves serrate with close incurved teeth.

6. *G. MEXICANA* Humb. & Bonpl. Pl. Aeq. 1: 144, *t.* 41; HBK. Nov. Gen. et Spec. 4: 247; Gray, Pl. Wright, 1: 111.

G. atriplicifolia Gray, l. c.

Michoacan, *Humboldt & Bonpland, Pringle*, no. 4167; Jalisco, *Palmer*, no. 214 (coll. of 1886), *Pringle*, no. 3484; Zacatecas, *Rose*, no. 2737; Morelia, *Galeotti*, no. 2418; Mirador, *Sartorius*; Morelos, *Pringle*, no. 6184; Volcano of Toluca, *Heller*, no. 443.

A portion of Galeotti's no. 2418 (the type number of *G. atriplicifolia* Gray) in herb. Gray so closely matches the perennial specimens of *G. Mexicana* that, although originally described as an annual, it seems undoubtedly this species, to which, in fact, Dr. Gray himself later reduced it (*Proc. Am. Acad.* 22: 423).

= Leaves dentate; teeth very sharp, spreading.

7. *G. arguta* (Gray)

G. Tulocarpus var. *arguta* Gray, *Proc. Am. Acad.* 21: 387.

Chihuahua, *Pringle*, rocky hills near the town of Chihuahua,

no. 678 (type in herb. Gray), also in foothills of the Sierra Madre, no. 1281. This species differs from *G. Tulocarpus* in its large heads and conspicuously elongated bracts, as well as in the differently toothed leaves.

++ ++ Heads smaller, numerous; involucre 2.7 to 3 mm. in thickness: leaves not hastately toothed at the base: pedicels 1 to 2 (or rarely 4) mm. long.

= Upper bracts of the inflorescence elongated, surpassing the heads: leaves narrowly lanceolate to linear.

8. *G. angustifolia* (Gray)

G. Tulocarpus var. *angustifolia* Gray in Wats. Proc. Am. Acad. 22: 423.

Copiously and cymosely branched, 4–6 dm. high; petioles 8 mm. long; leaves narrowly lanceolate to linear, scarcely paler beneath, serrate with five incurved callous-tipped teeth, not hastately toothed at the cuneate base, 7–8 cm. long, 1.2–1.4 cm. broad; heads numerous in small umbelliform, about 5-headed cymes; pedicels very short, 1–3 mm. long; involucre 7 mm. long, less than 3 mm. in diameter; scales acute: achenes gray, mottled, upwardly villous under a lens, 6 mm. long including the sterile base.

Jalisco, ravines near Tequila, *Palmer*, no 360 (type in herb. Gray), and on hillsides near Guadalajara, *Pringle*, no. 1737.

Differs from *G. Tulocarpus* not only in the form of the leaves but in the length of the bracts and general character of the inflorescence.

= = Upper bracts very small, much shorter than the heads: leaves lance-oblong.

9. *G. TULOCARPUS* Gray, Pl. Wright, 1: 111.

Tulocarpus Mexicanus Hook. & Arn., Bot. Beech. 299, t. 63.

Tepic, *Lay & Collie*; Zapelote, State of Tepic, *Lamb*, no. 580; between the city of Mexico and Mazatlan, *Gregg*, no. 585; Colima, *Palmer*, no. 1198 (coll. of 1891).

Readily recognized by its numerous small heads in close compounded small-bracteal cymes.

GRAY HERBARIUM OF HARVARD UNIVERSITY.